

Component			Source
Service	Function	Sub-Function	Requirement
Freeway Roadside Equipment			
TC			
MSNEO			
CSM			
5.2.1.001	Signals shall be capable of operating in automatic signal timing mode.		Derived
5.2.1.002	Signals shall be capable of operating in manual override mode.		GGO 6.5.2, USR 1.6.3.5
5.2.1.003	Signals shall be capable of operating in pre-emption or priority mode.		Derived
5.2.1.004	Signals shall be capable of operating in manual override using secured wire and wireless communications		MnA 976
5.2.1.005	Signal pre-emption shall be available on-demand for emergency vehicles at traffic signal intersections to minimize delays in responding to emergencies and reduce safety hazards when passing through intersections by providing preference over others.		GGO 6.5.3, MnA 973,9
5.2.1.006	Signal priority shall be available on-demand for transit vehicles and other authorized vehicles at traffic signal intersections along transit routes to facilitate adherence to transit schedules by providing preference over others.		GGO 6.5.3, USR 1.6.1.2.
5.2.1.007	Signal pre-emption and signal priority timing shall be determined automatically when signal pre-emption requests and/or signal priority requests are received from authorized emergency, transit, or railroad vehicles.		UST 5.2.3.2
ISTP			
5.2.2.003	Real-time, adaptive control of signaling devices shall be provided throughout the traffic control system network to allow traffic flow optimization via rapid modification of signal controls integrated with freeways.		GGO 6.10.1, USR 1.6.3.
5.2.2.004	Signal timing plans shall be integrated, coordinated and consistent across wide areas including multiple jurisdictions to avoid issuing conflicting controls and to minimize traffic delays.		USR 1.6.3.2, 1.6.3.2.1
5.2.2.005	Signal timing plans shall be maintained and modifiable on-demand in real-time.		USR 5.2.3. I
5.2.2.007	Signaling systems shall be programmable and fully adaptive.		GGO 6.5.1, MnA 968

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	5.2.2.008	Signal timing plans and signal controls shall be selectable/modifiable by traffic control operators in real-time to respond to changing traffic requirements and modify system response.	USR 1.6.3.1, 1.6.3.3.1, 1
	5.2.2.010	Signal timing plans and signal controls shall be selectable/modifiable in a coordinated manner across multiple jurisdictions to reduce traffic flow impact of an incident report.	USR 1.6.3.6, 1.7.2.5
	5.2.2.011	Signal timing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to traffic volume/occupancy data feedback.	USR 1.6.3.3.2, 1.6.1.6
	5.2.2.012	Signal timing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to current traffic conditions feedback.	USR 1.6.3.3.2,MnA 914
	5.2.2.013	Signal timing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to incident reports.	USR 1.6.3.3.2,MnA ?
	5.2.2.014	Signal timing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to current and predicted/forecast travel conditions.	USR I .6.3.3.2,MnA ?
	5.2.2.015	Signal timing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to reversible lane change requirements.	USR 1.6.3.3.2, 1.6.3.3.4
	5.2.2.018	Signal controls for currently selected signal timing plans shall be transmitted to the respective traffic signal devices throughout the signal network including freeway ramp meters.	USR 1.6.1.1.2, 1.6.3.3.3,
	5.2.2.019	Signal controls for currently selected signal timing plans shall be transmitted to the respective traffic signal devices throughout the signal network including HOV lane signals.	USR 1.6.3.4
	5.2.2.020	Signal controls for currently selected signal timing plans shall be transmitted to the respective traffic signal devices throughout the signal network including human operator.	USR 1.6.3.4
	5.2.2.022	Signal controls shall be updated via on-demand real-time communications along freeways.	MnA 985
	5.2.2.023	Signal controls shall be updated via on-demand real-time communications between arterials and MnA 947 freeways.	
MSR			
	5.2.3.001	Signal resources throughout the network shall be maintained by the respective owner agencies.	Derived
	5.2.3.002	Signal resources throughout the network shall be operated by the mutually agreed upon agencies.	Derived

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MSNO	CSM	5.2.3.003	Individual signal resource operation shall be capable of being passed to a different agency in accordance with documented operating agreements.	Derived
		5.3.1.001	Signs shall be capable of operating in automatic messaging mode.	Derived
		5.3.1.002	Signs shall be capable of operating in manual messaging mode.	Derived
		5.3.1.003	Sign controls shall be determined by the selected signing plans when in the automatic messaging mode.	Derived
	ISCP	5.3.1.004	Sign controls shall be operator controlled when in the manual messaging mode.	Derived
		5.3.2.001	Real-time, adaptive control of signing devices shall be provided throughout the traffic control system network to allow flow optimization via rapid modification of sign controls on arterials.	GGO 6.10.1, USR 1.6.3.
		5.3.2.002	Real-time, adaptive control of signing devices shall be provided throughout the traffic control system network to allow flow optimization via rapid modification of sign controls on highways.	GGO 6.10.1, USR 1.6.3.
		5.3.2.003	Real-time, adaptive control of signing devices shall be provided throughout the traffic control system network to allow flow optimization via rapid modification of sign controls integrated with freeways.	GGO 6.10.1, USR 1.6.3.
		5.3.2.004	Signing plans shall be integrated, coordinated and consistent across wide areas including multiple jurisdictions to avoid issuing conflicting messages and to minimize traffic delays.	USR 1.6.3.2, 1.6.3.2.1
		5.3.2.005	Signing plans shall be maintained and modifiable on-demand in real-time.	USR 5.2.3.1
		5.3.2.006	Sign controls shall be maintained and modifiable on-demand in real-time.	MnA 993
		5.3.2.007	Signing systems shall be programmable.	GGO 6.5.1, MnA 968
		5.3.2.008	Signing plans and sign controls shall be selectable/modifiable by traffic control operators in real-time to respond to changing traffic requirements and to modify system response.	USR 1.6.3.1, 1.6.3.3.1, 1

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	5.3.2.009	Signing plans and sign controls shall be selectable/modifiable via a single agency across multiple jurisdictions.	MnA 972
	5.3.2.010	Signing plans and sign controls shall be selectable/modifiable in a coordinated manner across multiple jurisdictions to reduce traffic flow impact of an incident report.	USR 1.6.3.6, 1.7.2.5
	5.3.2.011	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to traffic volume/occupancy data feedback.	USR 1.6.3.3.2, 1.6.1.6
	5.3.2.012	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to current traffic conditions feedback.	USR 1.6.3.3.2, MnA 914
	5.3.2.013	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to incident reports.	USR 1.6.3.3.2, MnA ?
	5.3.2.014	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to current and predicted/forecast travel conditions.	USR 1.6.3.3.2, MnA ?
	5.3.2.015	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to reversible lane change requirements.	USR 1.6.3.3.2, 1.6.3.3.4
	5.3.2.016	Signing plans shall be dynamically adaptable in real-time based on traffic situations including but not limited to turn restriction change requirements.	USR 1.6.3.3.2, 1.6.3.3.4
	5.3.2.017	Sign controls for currently selected signing plans shall be transmitted to the respective signing devices throughout the signal network including changeable message signs (fixed).	Derived
	5.3.2.018	Sign controls for currently selected signing plans shall be transmitted to the respective signing devices throughout the signal network including fixed-location variable message signs.	Derived
	5.3.2.019	Sign controls for currently selected signing plans shall be transmitted to the respective signing devices throughout the signal network including portable variable message signs.	Derived
	5.3.2.020	Sign control shall be updated via on-demand real-time communications along arterials.	MnA 915
	5.3.2.021	Sign control shall be updated via on-demand real-time communications along freeways.	MnA 985
	5.3.2.022	Sign control shall be updated via on-demand real-time communications between arterials and freeways.	MnA 947

Component			Source
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MTC	MSR		
	5.3.3.001	Sign resources throughout the network shall be maintained by the respective owner agencies.	Derived
	5.3.3.002	Sign resources throughout the network shall be operated by the mutually agreed upon agencies.	Derived
	5.3.3.003	Individual sign resource operation shall be capable of being passed to a different agency in accordance with documents operating agreements.	Derived
	CTD		
	5.4.1.001	Traffic surveillance data, needed for determining current traffic conditions and predicting future conditions, shall be collected and maintained.	USR 1.6.2.2
	5.4.1.002	Traffic surveillance data shall be collected throughout large geographic areas.	USR 1.6.2.3
	5.4.1.003	Traffic surveillance data shall be collected multiple jurisdictions.	USR 1.6.2.3
	5.4.1.004	Traffic surveillance data shall be collected for a large number of roadway segments.	USR 1.6.2.3.2
	5.4.1.005	Traffic surveillance data shall be collected at specific locations as needed.	USR 1.6.2.4
	5.4.1.006	Traffic surveillance data shall be collected in real-time.	USR 1.6.2.1
	DITC		
	5.4.3.008	Traffic surveillance data feedback shall be provided to signal network operations and sign network operations agencies to facilitate real-time, adaptive signaling and signing control.	USR 1.6.2.2.1
	5.4.3.009	Traffic conditions information feedback shall be provided to the signal network operations and sign network operations agencies to facilitate real-time, adaptive signaling and signing control.	USR 1.6.2.2.1
	DTC		
	5.4.2.001	Traffic surveillance data shall be processed to determine link-specific traffic speeds.	MnA 920, 9 21
	5.4.2.002	Traffic surveillance data shall be processed to determine link-specific as traffic flow parameters.	USR 1.6.2.3.1
	5.4.2.003	Traffic surveillance data shall be processed to determine link-specific congestion levels.	MnA 962

Component			Source
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PTCS		5.4.2.004 Traffic surveillance data shall be processed to determine link-specific vehicle presence.	USR 1.6.2.1
		5.4.2.005 Traffic surveillance data shall be processed to determine identity HOV vehicles.	USR 1.6.2.1.1
		5.4.2.007 Traffic speeds shall be accurate to (+/- TBD).	Derived
		5.4.2.008 Traffic flow shall be accurate to (+/- TBD).	Derived
		5.4.2.009 Link-specific traffic conditions information shall be determined for geographically referenced roadway segments.	Derived
	MTCP	5.1.2.001 Traffic control plans shall be developed based on traffic control requirements and strategies that consider traffic volume occupancy data analysis.	Derived
		5.1.2.002 Traffic control plans shall be developed based on traffic control requirements and strategies that consider traffic conditions data.	Derived
		5.1.2.006 Traffic control plans shall facilitate traffic movement in a manner that minimizes traffic delay times.	USR 1.6.1.1.3
		5.1.2.007 Traffic control plans shall facilitate traffic movement in a manner that minimizes energy use.	USR 1.6.1.1.4
		5.1.2.008 Traffic control plans shall facilitate traffic movement in a manner that maximizes traffic-movement efficiency.	USR 1.6.1.1
		5.1.2.009 Traffic control plans shall facilitate traffic movement in a manner that minimizes air quality impacts.	USR 1.6.1.1.5
		5.1.2.010 Traffic control plans shall facilitate traffic movement in a manner that incorporates current traffic demand.	USR 1.6.1.4
		5.1.2.011 Traffic control plans shall facilitate traffic movement in a manner that incorporates expected traffic demand.	USR 1.6.1.4
		5.1.2.012 Traffic control plans shall facilitate traffic movement in a manner that predicts travel patterns.	USR 1.6.1.5
		5.1.2.013 Traffic control plans shall include provisions for dissipating traffic congestion.	USR 1.6.1.4.1

Component			Source
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	5.1.2.014	Traffic control plans shall include provisions for moving traffic around incidents.	MnA 988
	5.1.2.015	Traffic control plans shall include provisions for handling predictable fluctuations in traffic patterns/volume (e.g.; workday rush hours, weekends, holidays, etc.).	Derived
	5.1.2.015.a	Traffic control plans shall include provisions for moving traffic in inclement weather.	Derived
	5.1.2.018	Traffic control plans shall be based on integrated traffic control strategies and traffic volume/occupancy data that are coordinated across multiple agencies/jurisdictional boundaries.	MnA 919,912
	5.1.2.019	Traffic control plans shall be based on integrated traffic control strategies and traffic volume/occupancy data that are coordinated along arterial/freeway corridors.	MnA 9 19,964
	5.1.2.020	Traffic control plans shall be based on integrated traffic control strategies and traffic volume/occupancy data that are coordinated for streets and highways.	MnA 919, USR 1.6.0
	5.1.2.021	Traffic volume/occupancy data shall be collected, stored and maintained to support traffic management performance analysis.	MnA 913,916
	5.1.2.022	Traffic volume/occupancy data shall be collected, stored and maintained to support growth planning analysis.	MnA 916
	5.1.2.023	Traffic volume/occupancy data shall be collected, stored and maintained to support problem intersection analysis.	MnA 918,983
	5.1.2.024	Traffic volume/occupancy data collection and analysis shall be coordinated across multiple agencies and jurisdictions.	MnA 923
	5.1.2.025	Traffic control plans shall be updated based on traffic control requirements changes and improvements identified from traffic volume/occupancy data analyses.	MnA 977
	5.1.2.026	Traffic control plans shall be selectable to suit the current or predicted traffic situations.	Derived
	5.1.2.027	The active traffic control plan shall include coordinated signal timing plans and signing plans that implement the traffic control strategy appropriate for the current or predicted traffic situation.	Derived

TCI

MTCD

STD

Component			Source
Service	Function	Sub-Function Requirement	
TFM	MTCI	1.1.1.006 Traffic surveillance data shall be sensed.	MnE 1.3
	DTCI	1.2.1.012.b Travel conditions shall be made available to humans	Derived
		1.2.1.023 Travel conditions shall be distributed via variable message signs.	MnE 1.3.3, 2.4.3, GGO
	MFO		
		MSA	
		7.2.4.008.a signal priority request shall be generated when a transit vehicle is running late by more the (tbd) minutes.	USR 2.1.1.2.3, MnA 5.3.
		7.2.4.008.b A signal priority request shall be generated when a transit vehicle is running late.	George Semmgard corn
		7.2.4.009 A signal priority request shall enable a transit vehicle to pre-empt both intersection traffic signals and ramp meter signals.	MnA 5.3.2
		7.2.4.010 Fleet vehicles shall arrive/depart within (TBD) minutes of the published schedule.	USR2.1.1.2.1